A.8 ROSSI X-RAY TIMING EXPLORER GUEST OBSERVER – CYCLE 10

1. Scope of Program

1.1 Overview

This program solicits proposals for the acquisition and analysis of new scientific data from the Rossi X-ray Timing Explorer (RXTE). The primary goal of this mission is to investigate the nature and physics of compact astrophysical objects as revealed through temporal variations in their high energy emission on time scales from microseconds to years. This solicitation is for Cycle 10 of the RXTE Guest Observer (GO) program, to be carried out beginning on or around March 1, 2005, and lasting approximately 12 months.

One hundred percent of the observing time on RXTE is available to the scientific community through this solicitation; that is, there is no guaranteed or reserved time for the original RXTE instrument teams. All proposals submitted in response to this program must be for new pointed observations with RXTE using either or both of the Proportional Counter Array (PCA) and High Energy X-ray Timing Experiment (HEXTE) instruments (see Section 1.2 below). Analyses of All-Sky Monitor (ASM) observations are the responsibility of the RXTE ASM team and the results are placed in the High Energy Astrophysics Science Archive Research Center (HEASARC) public archive as soon as possible after the data are obtained.

Note that, consistent with the above, investigations that do not require new pointed RXTE observations are not within the scope of this RXTE GO program, including:

- Proposals for specific configurations or observing sequences using the ASM or for analysis of ASM data;
- Proposals for analysis of archival RXTE data; and
- Proposals for complementary observations or theoretical work that do not require new pointed observations.

Finally, note that to enable the NASA Office of Space Science to properly evaluate the relevance of proposals submitted to its programs, as well as track its progress towards achieving its goals as mandated by the Government Performance Review Act (GPRA), all research supported by NASA's programs must now demonstrate its relationship to NASA Goals and Research Focus Areas (RFAs) as stated in the latest version of its Strategic Plan (follow links from the Web site http://spacescience.nasa.gov/); see also the discussion in Section I of the *Summary of Solicitation* of this NRA. Therefore, all proposers to this program element are asked to state their perception of this relevance in terms of the Goals, Science Objectives, and RFAs given in Table 1 found in the *Summary of Solicitation.* In particular, this program element is designed to help fulfill any of the RFAs for all of the Science Objectives for Goal II of both the science theme "Astronomical Search for Origins" and "Structure and Evolution of the Universe." The appropriate place for this statement of relevancy is in the introduction to the proposal's "Scientific/Technical/Management" section (see Section 2.3.5 in the *Guidebook for*

Proposers). The index numbers in this table may be used to identify a specific RFA, for example, "Goal I, Sun-Earth Connection Theme, RFA 1(c)" or "Goal II, Astronomical Search for Origins, RFA 3(b)."

1.2 The RXTE Mission

The Rossi X-ray Timing Explorer (RXTE) satellite was launched on December 30, 1995, and carries three scientific instruments: (i) the Proportional Counter Array, (PCA), developed at the NASA Goddard Space Flight Center (GSFC); (ii) the High-Energy X-ray Timing Experiment (HEXTE), developed at the University of California at San Diego (UCSD); and (iii) the All-Sky Monitor (ASM), developed at the Massachusetts Institute of Technology (MIT). The project is managed by GSFC. The observing time on RXTE is freely available to the international user community through peer reviewed proposals.

The primary purpose of RXTE is to study the structure and dynamics of compact X-ray sources, including accreting neutron stars, white dwarfs, and black holes in our galaxy, as well as compact, massive objects thought to be present in the nuclei of active galaxies through observations of temporal and broad-band spectral phenomena. The wide variety of physical processes involved in RXTE targets are typically characterized by substantial X-ray emission in the 2-250 keV energy range and variations in X-ray intensity on a wide range of time scales. RXTE is designed to study the intensity variations of these objects over times as short as microseconds and as long as years. The scientific objectives of successful RXTE investigations will address questions concerning the fundamental physics and astrophysics of such systems, including:

- characteristics of dense matter;
- behavior of plasma in high magnetic fields;
- identification of stellar black holes;
- interaction of binary stars through mass exchange and radiation;
- tests of General Relativity;
- the nature of quasi-periodic oscillators;
- the evolution and fate of compact X-ray sources; and/or
- the nature of the central engine of active galactic nuclei.

2. Programmatic Information

2.1 Proposal Submission and Evaluation

IMPORTANT INFORMATION

As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (OSS) is now using a single, unified set of instructions for the submission of proposals. This material is contained in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement – 2004* (or *NASA Guidebook for Proposers* for short) that is accessible by opening URL

http://research.hq.nasa.gov/, and linking through the menu item "Helpful References," or may be directly accessed online at URL http://www.hq.nasa.gov/office/procurement/nraguidebook/.

However, owing to the need to provide electronic data bases both to NASA Headquarters for overall cognizance of its research programs, as well as to the RXTE Science Operations Center for planning of the new observations requested by the investigations to be selected through this program element, proposers are asked to electronically submit proposal materials to two separate Web sites as detailed below.

2.1.1 Submission of Proposals to the RXTE Cycle 10 GO Program

NASA will review proposals for this program in a two-stage process. In the first stage, proposals will be evaluated with respect to their intrinsic merit and relevance to NASA's objectives. Proposals selected in the Stage 1 review will be awarded observing time on RXTE and become candidates for funding subject to the Stage 2 review process. The proposed cost of the investigation will be evaluated in the second stage.

In order to expedite the proposal review process and the timely selection of scientific peer review panels, investigators intending to submit proposals for participation in this program are asked to submit a Notice of Intent (NOI) to propose by the specified deadline to the Web address given in this NRA's *Summary of Solicitation.* Note that a NOI submission is not required but is of considerable value in helping NASA plan for an expeditious peer review of proposals.

Prospective proposers to Cycle 10 of the RXTE GO Program must adhere to the following procedures for the submission of Stage 1 proposals:

- Electronically submit a *Cover Page/Proposal Summary/Budget Summary* in compliance with Chapter 2.2 of the *Guidebook for Proposers*) at the Web site http://proposals.hq.nasa.gov. Since budget information for this program element is not required until Stage 2, proposers should use a placeholder value of $1 for the proposed cost of the investigation in the *Budget Summary* in order to allow submission. Print and retain the *Cover Page* for use in Stage 2.

- Complete and electronically submit all required forms at the RXTE Web site at http://rxte.gsfc.nasa.gov/docs/xte/cycle10.html. No hard copy submission of the proposal is required. Note that scientific justifications should not exceed four pages for proposals requesting less than 500 ksec of RXTE observing time, or six pages for proposals requesting 500 ksec or greater.

2.1.2 Evaluation and Selection of Proposals

Stage 1

Proposals will be evaluated with respect to the criteria specified in Section C.3 of the *Guidebook for Proposers* (excluding cost), where it is understood that the intrinsic merit of a proposal shall include the following factors:

- The suitability of using the RXTE observatory and data products for the proposed investigation;
- The degree to which the investigation uses RXTE's unique capabilities;
- The feasibility of accomplishing the objectives of the investigation within the time, telemetry, and scheduling constraints; and
- The feasibility of the proposed analysis techniques.

Based upon the results of the above reviews, the RXTE Program Scientist will recommend a set of proposals to the Director, OSS Astronomy and Physics Division, for final selection.

Stage 2

Subject to the availability of funding, successful Stage 1 proposers will be contacted by the RXTE Program Scientist and invited to submit a cost proposal for evaluation during Stage 2. Upon notification of selection of a Stage 1 proposal, a proposer must respond as follows:

- Follow the instructions for submitting a budget (not to exceed one year in duration) using either the budget forms found at the RXTE Cycle 10 Web site or using the proposing institution's own budget format. Preface this budget with the signed *Cover Page* from Stage 1 and submit in hard copy to the RXTE Guest Observer Facility (GOF).

- As part of the Stage 2 proposal, investigators may request support for correlative observations at other wavelengths, provided that they were proposed and accepted as part of the Stage 1 proposal. Funding for such correlative studies will be considered only insofar as they directly support a specific investigation using RXTE.

A review team comprised of a subset of the Stage 1 peer evaluation panel will be convened by NASA to review the Stage 2 cost proposals against factor (4) of the evaluation criteria as specified in Section C.2 of the *Guidebook for Proposers*.

A total of about $750K is tentatively planned for the support of up to 50 Cycle 10 Guest Investigations of one year duration each. The actual amount of funding available for the support of Cycle 10 Guest Investigations will be announced at the time of solicitation of Stage 2 proposals.

2.2 Supplemental Information

Further details of the proposal submission requirements and process may be found at the RXTE Cycle 10 Web site, http://rxte.gsfc.nasa.gov/docs/xte/cycle10.html, which includes a detailed mission description; technical information about the RXTE mission, instruments, and feasibility; detailed information regarding proposal submission, evaluation, selection and implementation; and instructions for completing the required proposal forms.

Technical questions concerning this program element may be directed to the RXTE GOF:

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Programmatic information may be obtained from the RXTE Program Officer:

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